



CANADIAN SPACE AGENCY

2008-2009

Departmental Performance Report

Minister of Industry

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MINISTER'S MESSAGE

The past year has been a challenging one for the Canadian economy, as it has been for the economies of all industrialized countries. The global economic crisis put the fiscal and economic frameworks of all countries to the test. But Canada entered the recession with solid fundamentals — balanced budgets, decreasing debt and taxes, a strong financial sector and robust economic policies. Consequently, Canada is in a comparatively good position to effectively respond to this time of economic challenge.

The Industry Portfolio played a significant role in developing Canada's resiliency and ability to weather the current crisis. Composed of 11 departments, agencies, Crown corporations and quasi-judicial bodies, the Portfolio includes major instruments in the Government of Canada's tool kit for building a competitive economy.



In 2008-2009, such measures included continued funding of the Canadian Space Agency to continue development of the RADARSAT Constellation and delivery of a Canadian-designed two-armed robot called "Dextre," which began operations aboard the International Space Station, highlighting the Agency's ongoing contribution and active participation in space exploration.

In January 2009, the government introduced Canada's Economic Action Plan, which contained stimulative measures to respond to the global recession. Industry Portfolio members played, and will continue to play, a central role in developing and implementing a significant number of these critical initiatives. These measures range from programs to upgrade research infrastructure at Canada's universities and colleges, to helping small businesses bring innovative products to market, to supporting major tourism events, to enhancing community and recreational facilities and other municipal infrastructure in Ontario. For more information, visit the [@Canada's Economic Action Plan](#) website.

As a country, we are emerging from the recession by creating a climate that encourages innovation, productivity and competitiveness — helping Canadian industry move to the forefront of the global knowledge economy. The Industry Portfolio members, and other federal departments and agencies are working in partnership so that Canada continues to enjoy a high standard of living and a prosperous future.

It is my pleasure to present the Canadian Space Agency's Departmental Performance Report for 2008-2009.

Tony Clement
Minister of Industry

PRESIDENT'S MESSAGE

This was a year of progress and success for the Canadian Space Agency. Canada recruited two new astronauts to join our highly successful astronaut corps. Thousands of Canadians sent us their applications and young Canadians across our country were inspired to pursue their studies and follow their dreams. During this time, we also prepared for two Canadian astronauts to take part in space missions, including a long-duration mission in the International Space Station - a first for our nation.

Canadian robotics played a critical role in every assembly mission to the International Space Station, further establishing our nation's legacy in space robotics. Indeed, Canada's space sector is renowned for its ability to drive innovation, creating world-leading new technology, and offering services on the ground that benefit Canadians in their daily lives. Yet Canada remains at a crossroads, where major projects like International Space Station robotics and the RADARSAT-2 Earth observation satellite, have been delivered and are now operational, and opportunities to collaborate with international partners in new space missions continue to grow.

In 2008-2009, the Canadian Space Agency carried out a series of consultations with its stakeholders and partners to define the future direction of Canada's space programs. As a result, a Long Term Space Plan will be presented to Government for consideration in the coming months. Meanwhile, the Agency remained committed to strong management, undertaking a Strategic Review to evaluate its programs and ensure they meet the needs and priorities of Canadians; they are aligned with the Government's Science and Technology Strategy; and they are effective and efficient.

It is my pleasure to submit, for tabling in Parliament, the Canadian Space Agency's Departmental Performance Report for 2008-2009. Together with our partners, we will continue to explore how we will help Government meet the needs of Canadians by using space to strengthen our infrastructure for the 21st century.

Steve MacLean,
President

SECTION 1: OVERVIEW

1.1 RAISON D'ÊTRE AND RESPONSIBILITIES

The mandate of the Canadian Space Agency (CSA) is *"to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians"*.

The CSA is achieving this mandate in cooperation with other government departments/agencies, industries, and universities, as well as international partners. In addition to delivering its own programs, the CSA is responsible for coordinating all federal civil space-related policies and programs pertaining to science and technology (S&T) research, industrial development, and international cooperation.

To learn more about the mandate of the Canadian Space Agency, go to:

<http://www.asc-csa.gc.ca/eng/about/mission.asp>

The Canadian Space Strategy (CSS) approved by the Government of Canada in February 2005 guides the Canadian Space Agency in the management of its programs. The Strategy is instrumental in focusing decision-making at the CSA and aligning all space related program activities through its strategic outcome and long-term priorities.

To learn more about the Canadian Space Strategy, go to:

<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp>

The release in 2007 of the Government's Science and Technology Strategy – *Mobilizing Science and Technology to Canada's Advantage* – provides the CSA with a solid framework with which to prioritise CSA programs and initiatives to "make Canada a world leader in science and technology and a key source of entrepreneurial innovation and creativity".

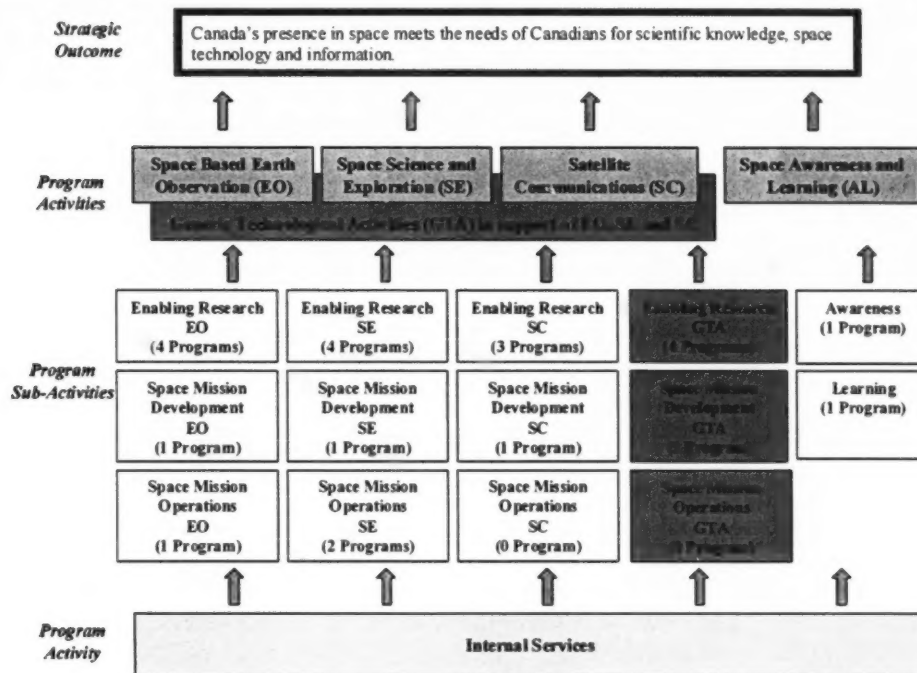
To learn more about the Canada's Science and Technology Strategy, go to:

http://www.ic.gc.ca/epic/site/ic1.nsf/en/h_00231e.html

CSA Governance Structure

Reporting to the Minister of Industry, the Canadian Space Agency's Chief Executive Officer is the President, assisted by the Executive Committee, which is composed of the Senior Vice-President, four Directors General (Space Science, Space Technologies, Space Programs, and Operations) as well as the Chief Financial Officer, the Chief Human Resources Officer, and the Director of Communications and Public Affairs. This governance structure became effective on January 2, 2008.

1.2 STRATEGIC OUTCOME AND PROGRAM ACTIVITY ARCHITECTURE



Strategic Outcome

In 2007-2008, further to step number one of the full implementation of the Management of Resources and Result Structures (MRRS), the three CSA's Strategic Outcomes were merged into a single Strategic Outcome, to which all program activities contribute: "Canada's presence in space meets the needs of Canadians for scientific knowledge, space technology and information".

Program Activities¹

Space Based Earth Observation (EO): To develop and operationalize the use of Space Based Earth Observation for the benefit of Canadians, especially in the fields of environment, resource and land use management, as well as security and foreign policy. In doing so, the CSA maintains and expands Canada's leadership in EO technologies to obtain the timely, relevant and essential information we need to make judicious decisions about our collective future.

¹ Description of Program Activities are taken from the Main Estimates available on line: <http://www.tbs-sct.gc.ca/est-pre/estime.asp>

Space Science and Exploration (SE): To better understand the Solar System and the Universe; expand our knowledge on the constituent elements and origins of life; and strengthen a human presence in space. In doing so, the CSA sustains and increases Canada's contribution to humankind's scientific knowledge, to the exploration of our solar system and the Universe and to the development of related technologies.

Satellite Communications (SC): To provide all Canadians with the means to participate and fully benefit from the global information age. In doing so, the CSA upholds Canada's status as a world leader in Satellite Communications and extends the most advanced products and services to all Canadians.

Generic Technological Activities (GTA): To provide leadership, coordination or support to Earth Observation, Space Science and Exploration, and Satellite Communications through activities that are generic in their nature since they contribute to all three program activities.

Awareness and Learning (AL): To further public understanding and engagement with regards to space related issues, ultimately improving the scientific literacy of Canadians by carrying out a national awareness and learning initiative in support of the CSA programs.

Internal Services: To implement the government's commitment to modern public service management in accordance with the Management Accountability Framework's (MAF) expectations.

1.3 PERFORMANCE SUMMARY

2008-2009 Financial Resources (\$ in millions)

Planned Spending	Total Authorities	Actual Spending
368.2	382.0	306.0

2008-2009 Human Resources (FTEs)

Planned	Actual	Difference
724.0	620.5	103.5

* Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

This year marks the first reporting on two of the three performance indicators for CSA's strategic outcome approved in 2007. For more detailed 2008-2009 performance information, go to: Section 2 – Analysis of Program Activities by Strategic Outcome.

CANADIAN SPACE AGENCY STRATEGIC OUTCOME	
Canada's presence in space meets the needs of Canadians for scientific knowledge, space technology and information.	
PERFORMANCE INDICATORS	2008-2009 PERFORMANCE
1. Canada's rank in terms of support for peaceful space-related R&D; the measurement will provide the list of CSA missions, looking 10 years into the future and identifying the following for each mission: - the CSA's role (leader or partner); and, - the CSA's contribution (%) to the total mission budget.	In 2008, Canada was positioned 9 th among OECD nations in <i>government budget outlays or appropriations in R&D</i> for civil space programs. The order of investment is as follows: USA, Japan, France, Italy, Germany, Spain, Korea, UK, Canada, Belgium, Netherlands, and Norway. This list does not include non-OECD members who are major space-faring nations such as Russia, India, China and Brazil.
2. State of the scientific, industrial and public sector communities involved in the space sector: - number of universities, companies and organizations involved; - number of people employed in space-related jobs; and, - number of corresponding FTEs in academia, industry and government.	In 2008, the Annual Space Sector Survey reported a space workforce of 6,742 people (6,205 in the private sector and 537 in the public sector) distributed among 215 organizations (130 companies, 35 universities, 28 federal departments and agencies and 22 other organizations such as not-for-profit associations and research centers).
3. Access and utilization by the Canadian government and industry of space data generated by Canadian space missions.	Not measured in 2008-2009.

1.3.1) Program Activity Alignment to Government of Canada Outcomes

Program Activity (\$ in millions)	2007-2008 Actual Spending	2008-2009 Main Estimates	2008-2009 Planned Spending	2008-2009 Total Authorities	2008-2009 Actual Spending	Government of Canada Outcomes
Space Based Earth Observation (EO)	66.6	145.2	149.6	118.6	63.0	A Clean and Healthy Environment
Space Science and Exploration (SE)	140.2	129.8	129.8	172.5	161.4	A Strong and Mutually Beneficial North American Partnership
Satellite Communications (SC)	26.9	30.0	30.0	32.8	27.1	A Safe and Secure Canada
Generic Technological Activities (GTA) in support of EO, SE and SC	52.7	54.3	54.3	50.4	47.5	An Innovative and Knowledge- Based Economy
Space Awareness and Learning (AL)	5.3	8.9	8.9	7.7	7.1	A Vibrant Canadian Culture and Heritage
TOTAL	291.7	368.2	372.6	382.0	306.0	

Notes: 1. Due to rounding, figures may not add to totals shown.

2. Program Activities shown in this table include amounts for Internal Services.

1.3.2) Contribution of Program Activity Priorities to the Strategic Outcome of the Canadian Space Agency

An increasing number of countries are now involved in the peaceful development and use of space and close to a thousand satellites are expected to be launched in the next ten years. Two-thirds of these satellite projects will serve government programs in Earth Observation and Space Science and Exploration while most of the commercial investments are mainly related to Satellite Communications. The Canadian government investments in these three fields are guided by the Canadian Space Strategy in order to meet the needs of Canadians for scientific knowledge, space technology and information.

Canada is at a crossroads where major projects have been delivered and are now operational, while opportunities to collaborate with international partners in major space missions are growing. Major projects are now fully operational: RADARSAT-2 Earth observation satellite; Dextre, the two-armed dexterous robot to the International Space Station (ISS); and, the successful flight demonstration of the KA broadband capabilities aboard the Anik F2 communication satellite. These and other remarkable accomplishments, combined with sustained contribution by Canadian astronauts to international space exploration missions, have continued to brand Canada as a science and technology focused and reliable trading partner.

In 2008-2009, the CSA undertook a Strategic Review to evaluate its programs and ensure that they continue to meet the needs and priorities of Canadians; were aligned with the Government's Science and Technology Strategy; and were effective and efficient. The CSA can make adjustments in a number of areas, among which:

- Strengthening planning, project management and risk mitigation of complex space projects and missions;
- Renewing Grants, Contributions and Sponsorship Program and strengthen collaborations with other Granting Councils to leverage CSA investments and expand the partnership between government, academia and space industry;
- Strengthening the use of RADARSAT-2 Earth Observation imaging by Government departments and agencies; and,
- Extending the existing agreement and outstanding collaboration of the CSA and Canada's science and space industry communities with the European Space Agency.

At the same time the CSA carried a series of consultations with its stakeholders and partners in order to move forward with a renewed impetus to sustain and enhance Canada's space advantage. A Long Term Space Plan will be presented to Government for consideration in 2009, and will propose investments to achieve its strategic and public policy interests with recommendations for Canada's role and participation in future space exploration activities. The critical challenges that Canada faces related to space consist of increasing significantly the use of space data and information by the Government of Canada to serve its strategic and public policy interests; ensuring the sustainability and capacity of its space industry and academia; and strengthening its international partnerships through meaningful, leading-edge contributions.

Program Activity – Space Based Earth Observation (EO)

OPERATIONAL PRIORITY

Develop and operationalize the use of Space Based EO for the benefit of Canadians.

TYPE

Ongoing

STATUS

Mostly met

TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)	ACHIEVED VS PLANNED TARGETS					
	2006-2007		2007-2008		2008-2009	
	15/18	83%	23/23	100%	13/15	87%
<u>TENDENCY</u> (Starting base value = 82%)	↑		↑		↑	

Tendency is established by comparison with the starting base value set in 2005-2006. Note the continued effort to rationalize total number of indicators for program sub-sub-activities.

Two indicators were partially met for the following reasons: one indicator achievement was less than anticipated and the other was due to one of the projects being put on hold.

MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)

The CSA maintained and expanded Canada's leadership in Earth observation technologies to obtain the timely, relevant and essential data needed to make judicious decisions about our collective future especially in the fields of environment, resource and land use management, as well as security and foreign policy. As a result, over the last 3 years:

- A total of 19 missions were either considered or undertaken generating 63 partnerships with the industry, universities or other Canadian government organizations;
- 70 applications emerged from EO technology development programs;
- RADARSAT-1 began its 14th year of operation in November 2008 and RADARSAT-2 its first;
- The partnership with the European Space Agency provided an average "Industrial return coefficient" of 1.19 compared to an expected return of at least 0.84; and,
- A total of \$166 million was spent over this period.

AREAS FOR FUTURE IMPROVEMENT

Through the Government Related Initiative Program strengthen the use of RADARSAT-2 Earth observation imaging by Government departments and agencies.

Following an evaluation, implement changes to enhance CSA capabilities in satellite operations.

Extend existing agreement and outstanding collaboration of the CSA, and Canada's science and space industry communities with the European Space Agency.

For more detailed 2008-2009 performance information, go to: Section 2 - Analysis of Program Activities by Strategic Outcome

Program Activity – Space Science and Exploration (SE)						
<u>OPERATIONAL PRIORITY</u>				<u>TYPE</u>		<u>STATUS</u>
Understand the solar system and the Universe, expand our knowledge of the constituent elements and origins of life, and strengthen the human presence in space.				Ongoing		Mostly met
TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)	ACHIEVED VS PLANNED TARGETS					
	2006-2007		2007-2008		2008-2009	
	24/28	86%	29/31	94%	22/23	96%
<u>TENDENCY</u> (Starting base value = 83%)	↑		↑		↑	
Tendency is established by comparison with the starting base value set in 2005-2006. Note the continued effort to rationalize total number of indicators for program sub-sub-activities.						
One indicator was partially met because the achievement was less than anticipated.						
<u>MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)</u>						
The CSA sustained and increased Canada's contribution to humankind's scientific knowledge, to the exploration of our solar system and the Universe and to the development of related technologies. As a result, over the last 3 years:						
- A total of 26 missions were either considered or undertaken generating 391 partnerships with the industry, universities or other Canadian government organizations; - Canadian astronauts participated in 2 missions and trained for 2 upcoming missions; - More than 1,400 peer-reviewed papers acknowledged the CSA's contribution and 1,892 presentations were delivered; - The CSA met year after year 100% of its requirements to the International Space Station program: the largest international scientific and engineering project ever undertaken; - The partnership with the European Space Agency provided an average "Industrial return coefficient" of 0.84 compared to an expected return of at least 0.84; and, - A total of \$400.6 million was spent over this period.						
<u>AREAS FOR FUTURE IMPROVEMENT</u>						
With the Budget 2009 additional funding of \$110 million allocated over the next three years, contribute to the development of terrestrial prototypes for space robotic vehicles, such as the Mars Lander and Lunar Rover, and further the development of other technologies and space robotics.						
Renew Grants, Contributions and Sponsorship Program and strengthen collaborations with other Granting Councils to leverage CSA investments and expand the partnership between government, academia and space industry.						

For more detailed 2008-2009 performance information, go to: Section 2 - Analysis of Program Activities by Strategic Outcome

Program Activity – Satellite Communications (SC)						
<u>OPERATIONAL PRIORITY</u>				<u>TYPE</u>		<u>STATUS</u>
Provide all Canadians with the means to participate in and fully benefit from the global information age.				Ongoing		Somewhat met
TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)	ACHIEVED VS PLANNED TARGETS					
	2006-2007		2007-2008		2008-2009	
	7/9	78%	7/8	88%	4/6	67%
<u>TENDENCY</u> (Starting base value = 69%)	↑		↑		↓	
Tendency is established by comparison with the starting base value set in 2005-2006. Note the continued effort to rationalize total number of indicators for program sub-sub-activities.						
One indicator was partially met because of a project slip and one indicator was not measured due to organizational transition and lack of resources in one program sub-sub-activity.						
<u>MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)</u>						
The CSA contributed to uphold Canada's status as a world leader in Satellite Communications and extend the most advanced products and services to all Canadians, including those living in northern communities. As a result, over the last 3 years:						
- 5 technology demonstration projects were put forward; - 2 joint studies involving the departments of Transport Canada, National Defence, Environment Canada, and Indian and Northern Affairs were brought forward for consideration; - The partnership with the European Space Agency provided an average "Industrial return coefficient" of 1.00 compared to an expected return of at least 0.84; and, - A total of \$76.9 million was spent over this period.						
<u>AREAS FOR FUTURE IMPROVEMENT</u>						
Optimise the use of the Government of Canada capacity credit for Anik F2 broadband telecommunications for trials of innovative services to northern communities by government departments.						
Support the Government's Arctic priorities particularly the need to provide satellite full-time coverage over Canada up to the North Pole.						

For more detailed 2008-2009 performance information, go to: Section 2 - Analysis of Program Activities by Strategic Outcome

Program Activity – Generic Technological Activities (GTA) in support of EO, SE and SC

OPERATIONAL PRIORITY

Provide leadership, coordination or support to Earth Observation (EO), Space Science and Exploration (SE), and Satellite Communications (SC) through generic technology research and space-qualification activities.

TYPE

Ongoing

STATUS

Somewhat met

TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)	ACHIEVED VS PLANNED TARGETS					
	2006-2007		2007-2008		2008-2009	
	6/7	86%	7/8	88%	4/7	57%
<u>TENDENCY</u> (Starting base value = 86%)	Base		↑		↓	

Tendency is established by comparison with the base value set in 2006-2007. Note the continued effort to rationalize total number of indicators for program sub-sub-activities.

Three indicators were partially met; note that they were close to achieving newly set targets.

MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)

Through its research and development investments and the resulting transfers of applications to the private and public sectors, the CSA helped enhance the Canadian space industry's competitiveness and increased Canada's ability to compete in the global marketplace in the fields of Earth observation, space science and exploration, and satellite communications. As a result, over the last 3 years:

- A total of 20 partnerships were created with universities and industry in high-risk technology research and development initiatives, and 19 patents were either filed or obtained;
- On average per year, the David Florida Laboratory supported 7 CSA missions and more than 100 commercial projects;
- The partnership with the European Space Agency provided an average "Industrial return coefficient" of 1.2 compared to an expected return of at least 0.94; and,
- A total of \$135.5 million was spent over this period.

AREAS FOR FUTURE IMPROVEMENT

Participate in the renewal of the Grants, Contributions and Sponsorship Program and strengthen collaborations with other Granting Councils to leverage CSA investments and expand the partnership between government, academia and space industry.

Following an evaluation, implement changes to enhance capabilities of the David Florida Laboratory.

For more detailed 2008-2009 performance information, go to: Section 2 – Analysis of Program Activities by Strategic Outcome

Program Activity – Space Awareness and Learning (AL)

<u>OPERATIONAL PRIORITY</u>	<u>TYPE</u>		<u>STATUS</u>			
Further public understanding and engagement with regards to space related issues, ultimately leading to improving the scientific literacy of Canadians.	Ongoing		Met all			
TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)	ACHIEVED VS PLANNED TARGETS					
	2006-2007		2007-2008		2008-2009	
	14/16	87%	15/16	94%	3/3	100%
<u>TENDENCY</u> (Starting base value = 94%)	↓		=		↑	
Tendency is established by comparison with the base value set in 2005-2006. Note the considerable effort to rationalize total number of indicators for program sub-sub-activities.						
<u>MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)</u>						
The CSA fostered science and technology literacy and offered opportunities to enhance the expertise of Canadian scientists, engineers and physicians in space science, space technology and space medicine. As a result, over the last 3 years:						
- More than four million people visited the CSA's website; - On average, Canadian astronauts reached 25,000 persons yearly through public events; - A total of 5,267 educators and 4.3 million Canadian students were reached through the Space Learning Program; - A total of 203 graduate students, fellows and medical residents were supported through the Program in support of Research and Training in Space Science, Space Technology and Space Medicine; and, - A total of \$14.7 million was spent over this period.						
<u>AREAS FOR FUTURE IMPROVEMENT</u>						
Renew Grants, Contributions and Sponsorship Program to further learning activities in relationship with science centres and museums, youth and science associations, and the education community across Canada as well as enhance expertise of Canadian scientists, engineers and physicians in space science, space technology and space medicine.						

For more detailed 2008-2009 performance information, go to: Section 2 – Analysis of Program Activities by Strategic Outcome

Program Activity – Internal Services						
<u>MANAGEMENT PRIORITY</u> To implement the government’s commitment to modern public service management in accordance with the Management Accountability Framework.				<u>TYPE</u> Ongoing		<u>STATUS</u> Somewhat met
<u>TARGET ACHIEVEMENTS (PROGRAM SUB-SUB-ACTIVITIES)</u>	<u>ACHIEVED VS PLANNED TARGETS</u>					
	<u>2006-2007</u>		<u>2007-2008</u>		<u>2008-2009</u>	
	NA	NA	13/14	93%	3/6	50%
<u>TENDENCY</u> (Starting base value = 93%)	NA		Base		↓	
Tendency is established by comparison with the base value set in 2007-2008. Note the considerable effort to rationalize total number of indicators for program sub-sub-activities. One indicator was partially met although it showed significant progress towards achieving the targets and two indicators were postponed for Strategic Review and Long Term Space Plan concurrent exercises were prioritized.						
<u>MAIN ACCOMPLISHMENTS OVER THE LAST 3 YEARS (2006-2009)</u> A 3-years summary is unavailable this year because this section appears for the first time in 2008-2009.						
<u>AREAS OF FUTURE IMPROVEMENT</u> Strengthen planning, project management and risk mitigation of complex space missions in accordance with the new Government wide Policy on the Management of Projects. Ensure that investment and project management meets standards set by the new Government wide Policy on Investment Planning, Assets and Acquired Services, and the Policy on the Management of Projects.						

For more detailed 2008-2009 performance information, go to: Section 2 – Analysis of Program Activities by Strategic Outcome

1.4 RISK ANALYSIS

Strategic Context of the Canadian Space Agency

INTERNATIONAL CONTEXT

Space is recognized by industrialized nations as an essential and strategic tool to meet their social, economic, and foreign policy objectives. Accordingly, many governments around the world of traditional and emerging space-faring nations are increasing their investments in space activities, looking for increased consolidation and advancement of their space capabilities. In terms of public expenditures in the space sector, Canada has been losing ground over the past decade when compared with other space nations.²

International cooperation is critical to the implementation of the Canadian Space Strategy. Working in partnership with other space-faring nations, Canada can leverage its resources and maximize its return on investment, sharing technical expertise, knowledge, and infrastructure, while gaining access to areas where Canada has chosen not to invest due to limited resources. In addition, there are increasing concerns over issues such as space debris and climate change. These transcend national borders and favour increased cooperation between nations with common goals. Canada's space infrastructure must not only meet national strategic needs, but must also play a tangible role in responding to issues of interest to the international community.

Canada is regarded as a reliable partner that possesses unique technical and scientific capabilities, and as a nation that can meaningfully contribute to the initiatives of foreign space agencies. In particular, emerging space-faring countries in Asia and South America may offer great potential for future cooperation. Thus, Canada continues efforts to gain a foothold in these emerging markets. It is of paramount importance that the Canadian Space Agency continues its work with stakeholders to ensure the competitiveness of our research communities and industries with world markets. Canada's space industry is perceived as internationally competitive. This was confirmed by the results of the 2008 Annual Survey of the Canadian Space Sector.³ With yearly revenues of \$2,793 billion, \$1,405 billion comes from exports, representing 50% of the industry's total revenues. The main destinations of Canadian space exports are as follows:

- The U.S. remains the largest market accounting for 52.1% (or, \$733 million) of the \$1,405 billion of total exports. Europe remains second overall, accounting for 28.4% (or, \$399.5 million).
- Export revenues from Oceania increased by 7.5% - from \$47.6 to \$51.2 million.
- Export revenues from South America increased by 63.8% - from \$31.8 to \$52.1 million.
- Export revenues from Africa increased by 71.4% - from \$5.4 to \$8.9 million.

² EUROCONSULT – CONFERENCE BOARD OF CANADA: Socio-economic Study and Policy Analysis of Future Canadian Investments in Space-based Robotics Opportunities (2006)

³ CSA: State of the Canadian Space Sector 2008

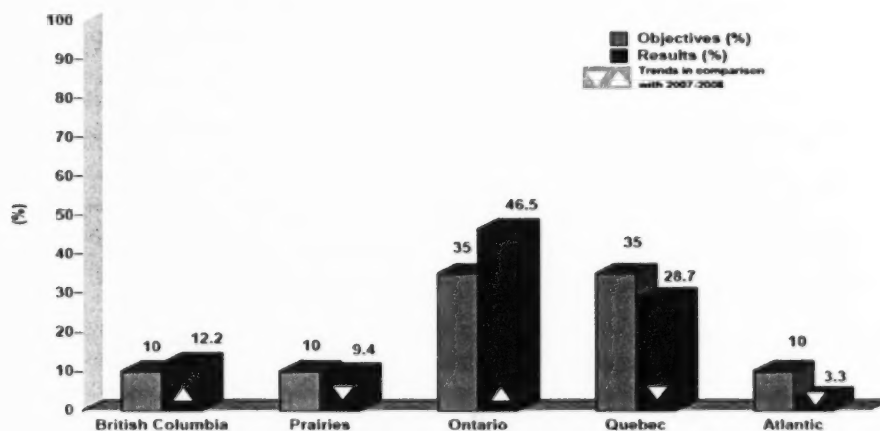
NATIONAL CONTEXT

The Canadian Space Agency recognizes that the best means of turning scientific and technological advancements into innovative products and services is through partnerships with Canadian universities and industry. With its highly skilled workforce, the space industry in Canada not only generates wealth in our economy, but also provides competitive products and services. Given that the national market is relatively small, it is critical that the Canadian space industry be able to leverage foreign investments and generate export sales. Capitalizing on export revenue depends on the industry's ability to commercialize highly competitive products and services, and establish local partnerships. In 2008, Satellite Communications continued to dominate the largest share of Canada's space sector with revenues increasing by \$314 million (17.1%) from \$1,832 billion to \$2,146 billion. A breakdown of the revenues by sectors of activity is as follows:⁴

- Satellite Communications: 76.8% (\$2,146 billion)
- Earth Observation: 7.1% (\$200 million)
- Navigation: 9% (\$254 million)
- Robotics: 4% (\$110 million)
- Space Science: 2% (\$68 million)
- All space-related activities in other areas: 0.5% (\$16 million)

Regional Distribution of Government Space-Related Funding From 1988-1989 to 2008-2009

Regional Distribution of Government Space Related Funding
(as of March 31, 2009)



Source: CSA Organized Research Information System (ORIS), March 31, 2009.

⁴ CSA: State of the Canadian Space Sector 2008

While small in the number of firms, the Canadian space sector is knowledge-intensive and is at the forefront of research and innovation. Building on the strengths of 6,742 skilled workers, including 2,189 highly qualified personnel Canadian firms have acquired world-leading capabilities in niche areas such as Earth observation, space robotics, communications and navigation satellites.

To learn more about Canadian space-related organizations, go to:

<http://www5.asc-csa.gc.ca/eng/industry/csd.asp>

GOVERNMENT CONTEXT

1- The Canadian Science and Technology Strategy

The objective of the Government Science and Technology (S&T) Strategy is to "make Canada a world leader in science and technology and a key source of entrepreneurial innovation and creativity". In order for Canada to achieve this objective, the S&T Strategy identifies the following three underlining conditions for success: a strong private-sector commitment to S&T, a strengthened knowledge base and, be a magnet for talent. In 2008-2009, the CSA undertook a Strategic Review to evaluate its programs and ensure that they were aligned with the Government's S&T Strategy. As indicated in the Budget 2009 announcement, the CSA will make adjustments in order to continue to meet the needs and priorities of Canadians.

To learn more about the Canadian Science and Technology Strategy, go to:

http://www.ic.gc.ca/epic/site/ic1.nsf/en/h_00231e.html

2- The Canadian Space Strategy

Approved by the Government of Canada in February 2005, the Canadian Space Strategy was developed in full consultation with Government of Canada organizations and Canadian stakeholders. It is the framework that guides all CSA programs and provides our stakeholders and partners with insight on Canada's strategic directions. While the Canadian Space Strategy preceded the S&T Strategy it embraces the principles of world-class excellence, and contains a similar set of priorities and innovative national partnerships. The CSA implements the Canadian Space Strategy priorities through the following five building blocks:

- 1) A strong science capacity;
- 2) A proficient technology base;
- 3) Dynamic space industry focused on expanding markets;
- 4) National and international partnerships; and,
- 5) Qualified test and operations infrastructures.

To learn more about the Canadian Space Strategy, go to:

<http://www.asc-csa.gc.ca/eng/publications/default.asp#strategy>

3- Integrated Corporate Human Resources Management

A Human Resources analysis of the CSA's workforce indicated that the Agency had attained a degree of stability since 2005-2006. In 2008-2009, the CSA had a growth rate of 2.2% and a turnover rate of 7%. The workforce distribution showed that the average age of employees is 43.8 years compared to 44 years (2008) in the federal Public Service. The analysis also revealed that 53.6% of the CSA's workforce has less than 10 years of service in the government making the majority of CSA's workforce ineligible for retirement.

In June 2007, the CSA approved an Integrated Corporate Human Resources Plan to guide its human resources planning, recruitment, retention, development and succession planning initiatives over the next three years. An integrated human resources plan is an essential tool to assist the CSA in its recruitment, development and retention activities, assuring it has the highly qualified and motivated workforce required to meet its current needs, and to be ready to take on challenging space missions in the future. The Integrated Corporate Human Resources Plan identified strategies to address the following challenges:

- Organizational needs and recruitment;
- Management capacity;
- Competency-based management and succession development; and,
- Workplace well-being.

4- Corporate Risk Management

The CSA reviewed the mitigation action plans developed to address each of the corporate risks identified as the highest priorities in 2008-2009. While progress was noted, the CSA assessment concluded that the targeted risk tolerance levels were not reached and that the priorities and actions plans should be pursued in 2009-2010. The definitions of the priority corporate risks were reviewed in the RPP 2009-2010 as follows:

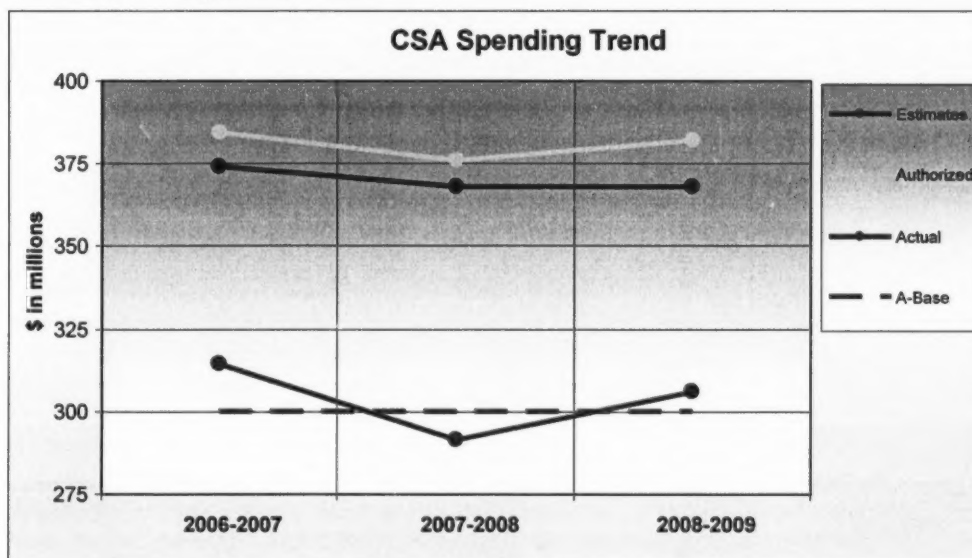
Integration and Implementation: Capacity of CSA to align its strategies, planning, priorities, funding levels, operations and capacity to deliver, and to obtain clear understanding and buy-in from managers and staff at all levels.

Trust in CSA Governance: Capacity of CSA in gaining and maintaining the confidence of the Minister, Central Agencies and stakeholders in the governance and effective management of its affairs in accordance with the public service values and ethics.

Workforce: Capacity of CSA to hire and maintain a qualified workforce to deliver its mandate within the government legislative frameworks, policies and rules.

1.5 EXPENDITURE PROFILE

1.5.1) Spending Trend



The CSA's A-base funding has been maintained at \$300 million per annum since 1999. However, authorities and estimates are significantly higher than this amount and fluctuate from year to year for two reasons: the incremental funds (\$111 million) allocated in 2005 over five years to the RADARSAT Constellation mission for the development of the next generation radar Earth observation satellites and secondly, the cumulative impact of funds reprofiling caused by delays in project implementation. Conversely, the recurrent annual under-spending results from cumulative reprofiling of capital funds, mainly for the RADARSAT development and space science projects, due to a series of uncertainties and technical challenges, some with international partners, impeding the implementation of space-related initiatives.

1.5.2) Voted and Statutory Items

Vote # or Statutory Item (S)	Truncated Vote or Statutory Wording (\$ in millions)	2006-2007 Actual Spending	2007-2008 Actual Spending	2008-2009 Main Estimate	2008-2009 Actual Spending
25	Operating expenditures	192.0	178.9	193.1	196.6
30	Capital expenditures	56.7	56.8	118.1	56.9
35	Grants and Contributions	56.8	46.7	46.4	43.0
(S)	Contributions to employee benefit plans	8.9	9.2	10.6	9.4
TOTAL		314.4	291.7	368.2	306.0

Notes: Due to rounding, figures may not add to totals shown.

SECTION 2: ANALYSIS OF PROGRAM ACTIVITIES BY STRATEGIC OUTCOME

2.1 STRATEGIC OUTCOME PERFORMANCE

This year marks the first reporting on two of the three performance indicators for CSA's strategic result approved and established in 2007. Though partial, this year's analysis should be considered as a first layer to which, incrementally over the next 10 years, additional details will increase its depth.

CANADIAN SPACE AGENCY STRATEGIC OUTCOME	
Canada's presence in space meets the needs of Canadians for scientific knowledge, space technology and information.	
PERFORMANCE INDICATORS	2008-2009 PERFORMANCE
1. Canada's rank in terms of support for peaceful space-related R&D; the measurement will provide the list of CSA missions, looking 10 years into the future and identifying the following for each mission: - the CSA's role (leader or partner); and, - the CSA's contribution (%) to the total mission budget.	In 2008, Canada was positioned 9 th among OECD nations in <i>government budget outlays or appropriations in R&D</i> for civil space programs. The order of investment is as follows: USA, Japan, France, Italy, Germany, Spain, Korea, UK, Canada, Belgium, Netherlands, and Norway. This list does not include non-OECD members who are major space-faring nations such as Russia, India, China and Brazil.
2. State of the scientific, industrial and public sector communities involved in the space sector: - number of universities, companies and organizations involved; - number of people employed in space-related jobs; and, - number of corresponding FTEs in academia, industry and government.	In 2008, the Annual Space Sector Survey reported a space workforce of 6,742 people (6,205 in the private sector and 537 in the public sector) distributed among 215 organizations (130 companies, 35 universities, 28 federal departments and agencies and 22 other organizations such as not-for-profit associations and research centers).
3. Access and utilization by the Canadian government and industry of space data generated by Canadian space missions.	Not measured in 2008-2009.

Indicator 1 – Performance Analysis

Canada's ranking among other OECD countries is an insufficient indicator unless edified with complementary information such as a full spectrum of the level of support for each mission, an assessment of their level or diversity as well as the alignment with the Government of Canada and department's priorities. The mechanisms needed to gather systematically and continuously such information are not fully in place yet.

Source: EUROCONSULT: Government Space Markets World Prospects to 2017 (2008).

Indicator 2 – Performance Analysis

The second indicator, the state of the Canadian Space sector, is solely based on a survey completed on a voluntarily basis. For the time being, this survey is the only source providing a pulse of the Canadian space community. It is precious and reliable as long as necessary resources are provided to sustain or even improved its response's levels. 2008 was a good year in terms of number of responses and their timeliness. The results gathered by this survey have the potential to become key in the analysis of the Agency's strategic result. Awareness and promotional activities with the Canadian space sector about this precious data collection must be maintained or increased.

Source: CSA's State of the Canadian Space Sector Survey Results.

Indicator 3 – Performance Analysis

This indicator was not measured in 2008-2009. Identifying who accesses space data within the federal government was the first step in honing the data collection mechanism required for all aspects of this indicator. Awareness activities constitute the second step, essential to obtain such information.

Source: Internal reporting documents.

2.2 PROGRAM ACTIVITY PERFORMANCE

The PAA is divided into six program activities; all of them contribute to a single strategic outcome. The first four are in line with the Canadian Space Strategy thrusts: *Space Based Earth Observation, Space Science and Exploration, Satellite Communications, and Space Awareness and Learning*. A fifth program activity, *Generic Technological Activities*, supports the three science and technology program activities. The *Internal Services* program activity supports all program activities.

In 2008-2009, the Program Activity results and indicators were thoroughly reviewed during strategic Performance Measurement Framework (PMF) exercise. Therefore, this Departmental Performance Report is starting a new cycle of reporting based on the reviewed performance measurements.

2.2.1) Space Based Earth Observation

SPACE BASED EARTH OBSERVATION	
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
<u>BENEFITS FOR CANADIANS</u>	
Earth observation (EO) enables monitoring of the environment with unparalleled coverage and scope, enhancing our forecasting capabilities and our understanding of environmental systems. EO data are used for sustainable management and development of natural resources, land use, fisheries and agriculture and providing support for disaster management. EO missions are critical to security and sovereignty, offering cost-effective, wide-area surveillance of land and maritime environments that are difficult to access such as the Northwest Passage. Among Canada's government users benefiting from EO data are Environment Canada, Fisheries and Oceans Canada, the Canadian Ice Service, Natural Resources Canada, the Department of National Defence, and the provinces and territories.	
<u>EXPECTED RESULT</u>	
The benefits of activities involved in Earth Observation from space serve Canadian users in the fields of environment, resource and land-use management, and security and sovereignty.	
<u>MAIN ACCOMPLISHMENTS IN 2008-2009</u>	
RADARSAT-2 is fully operational since April 2008. A total of 264 projects were supported during the 2008-2009 period, focussing on applications development of the advanced mode of RADARSAT-2. The portion of the Canadian government data allocation value at \$445 million used this year was \$13.8 million. The CSA continued the planning of the first satellite for the RADARSAT Constellation, the follow-on mission to RADARSAT-2, to be launched in 2014. Canada's first scientific satellite, SCISAT, entered its 6th year of successful operation with an expanding the range of coverage from international agreements. Canada's participation in ESA-EO programs opened the door to ten teams of Canadian scientist, and nine value-added companies were attributed contracts.	
Indicators	Performance Summary
1. Proportion of active missions relative to the total number of missions supported by Canada in the EO priority areas.	28 %; 9 active missions out of 35 supported missions.
2. Number of applications developed as a result of CSA's participation in space missions and/or support to projects/activities in EO considered "operational" from program standards.	A total of 23 applications became operational in 2008-2009.
3. Number of uses of EO data as a result of CSA's participation in space missions and/or support to projects/activities in EO.	A total of 44 uses were reported.

Indicator 1 – Performance Analysis

(Year) = Actual or projected launch date or date of completion when known.

* = New missions in 2008-2009 – 31% (11/35)

EO missions at the Operation stage (9):

CloudSat (2006), ESA-ENVISAT (2002), ESA-ERS-2 (2005), ESA-GOCE (2009), MOPITT (1999), OSIRIS (2001), RADARSAT-1 (1995), RADARSAT-2 (2008), SCISAT (2003).

*EO missions at the Development stage(13): * = 3*

RADARSAT Constellation (2014), ESA/JAXA-EarthCARE (2013), ESA-ADM/Aeolus (2009), ESA-Cryosat (2009), ESA-Sentinel-1 (2011), ESA-Sentinel-2* (2012-2016), ESA-Sentinel-3*, ESA-Sentinel-5 Precursor*, ESA-SMOS (2009), ESA-Swarm (2011), JC2Sat, NIRST (AQUARIUS / SAC-D) (2010), PROBA-2 (2009).

*EO missions under review (13): * = 8*

CANSOC, CASS*, MCAP*, MEOS*, MOPITT-2, PCW/PolarSat (weather component) (2016), SMAP*, Snowsat*, SOAR*, STEP*, SWIFT (Chinook) (2014), TICFIRE*, WaMI.

Missions' descriptions can be found in the electronic version of "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:

<http://www.asc-csa.gc.ca/eng/publications/default.asp#parliament>

Indicator 2 – Performance Analysis

A total of 23 applications became operational in 2008-2009; 17 from the EOADP and 6 from GRIP divided as such: 9 monitoring applications (*e.g. sea ice mapping, flood mapping, ice river jam*), 2 detecting applications (*e.g. ship detection, iceberg identification and location*), and 12 measuring applications (*e.g. soil subsidence map, geohazard mapping*).

Source: Internal documents.

Indicator 3 – Performance Analysis

Twenty-six of the 44 uses (60%) reported had national purposes. The uses could be grouped under four main themes: Natural disaster, the Great North/Arctic, Water/Fisheries, Forest/Mining/Agriculture. Here are a few examples taken from CSA's EO Express publication:

Natural catastrophes: RADARSAT-1 data contributed to emergency response operations for the aftermath of the 7.8 Earthquake in eastern Sichuan, China (Edition 27 – topic 13).

The Great North/Arctic: Because the Arctic has seen the highest rate of climate warming and with their protected nature, national parks, are clearly the best laboratories for studying and reporting climate change in the Arctic ecosystems to Canadians (Edition 26 – topic 2).

Water/Fisheries: In partnership with the Department of Fisheries and Oceans, new tools and methodologies based on Earth observation data are being developed to better understand ocean ecosystems, climate changes and renew the economic viability of our fisheries. As a result, the first patch of Sargassum on the North Atlantic Ocean was detected. Sargassum is a floating marine vegetation that absorbs carbon dioxide (CO₂) a greenhouse gas that contributes to global warming (Edition 31 – topic 1).

Forest/Mining/Agriculture: The province of Alberta often has landslides, which have serious consequences for the economy, transport infrastructure and the health of Canadians. Information from Earth observation satellites enables the Alberta Geological Survey to monitor soil movements by radar interferometry techniques. Space-derived information is used to map geological hazards and produce land-use planning tools for decision-makers and the oil industry (Edition 26 – topic 7).

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:
<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
129.2	100.7	46.3
2008-2009 – Human Resources (FTEs)		
Planned	Actual	Difference
82.2	60.4	21.8

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

To learn more about Earth Observation, go to:
<http://www.asc-csa.gc.ca/asc/eng/satellites/default.asp?page=observation>

2.2.2) Space Science and Exploration

SPACE SCIENCE AND EXPLORATION
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT
<u>BENEFITS FOR CANADIANS</u> The CSA sustains and increases Canada's contribution to humankind's scientific knowledge and to the development of space related technologies. In the context of environmental change and resource depletion, fundamental and applied research in physical and life sciences and in space exploration has great potential to bring about socio-economic benefits. For instance, the development of a surface mobility capability on the Moon will require the use of solar-powered electrical propulsion vehicles, which, in turn, could well lead the way toward spin-off commercialization of green technologies for the transport vehicles of the future. Space exploration, science and technology endeavours, which often involve international partners, position Canada to play an influential role in building strong and mutually beneficial partnerships with an increasing number of space-faring countries. In striving to become one of the most advanced, connected and innovative nations in the world, Canada offers and shares tremendous opportunities for the prosperity of global commerce and the safety of the global community through the peaceful use of space. <u>EXPECTED RESULT</u> Participation in Canadian and international missions expands the scientific knowledge base made available to Canadian academia and research and development communities in the areas of astronomy, space exploration and solar-terrestrial relations, as well as in physical and life sciences.

MAIN ACCOMPLISHMENTS IN 2008-2009

The successful Phoenix Mars Lander mission ended in November 2008. Phoenix exceeded expectations by performing breakthrough science far beyond its planned 90-days in the hostile environment of the Red Planet, with discoveries like the presence of water ice in the Martian soil, and the Canadian discovery of snow falling from clouds in Mars' atmosphere.

Two new astronauts were chosen among 5,351 applicants after a year-long recruitment process; Jeremy Hansen and David St-Jacques are the first Canadians to join the astronaut corps since 1992.

Indicators	Performance
1. Proportion of active missions relative to the total number of missions supported by Canada in the SE priority areas.	37 %; 33 active missions out of 89 supported missions.
2. Number of scientific instruments and technological applications developed as a result of CSA's participation in space missions and/or support to projects/activities in SE.	A total of 58 scientific instruments and technological applications combined.
3. Number of peer-reviewed papers produced in academia and the R&D community in Canada recognizing CSA's support through its participation in space missions and/or support to projects/activities in SE.	A total of 397 peer-reviewed papers, reports and conference proceedings acknowledging CSA funding were published in 2008-2009.

Indicator 1 – Performance Analysis

(Year) = Actual or projected launch date or date of completion when known.

* = New missions in 2008-2009 – 45% (40/89)

*SE missions completed (20): * = 3*

Astronauts: STS-115 (2006), STS-118 (2007), STS-121 (2006), TMA-6/10S (2005); BLAST (2007), eOSTEO (2008), EVARM, FUSE (2008), H-Reflex, ICE-First (2004), MSS: STS-114 (2005), STS-119 (2009)*, STS-123 1J/A DEXTRE (2008), STS-124 (2008)*, STS-126 (2008)*; Phoenix (2008), PMDIS (2008), SCCO (2009), TRAC (2008), WISE (2005).

SE missions at the Operation stage (13):

ADAMS, BISE (2009), CADC/Hubble (2008), CCISS (2007), CGSM (2007), ELERAD (2006), ESA-Herschel-HIFI/Spire (2009), ESA-Planck (2009), Mangaroni (2008), Matroshka-R (2006), MOST (2003), MVIS (2008), THEMIS (2007).

*SE missions at the Development stage (22): * = 6*

Astronauts: Expedition 20/21 (2009)*, STS-127 (2009)*; BCAT-5 (2009)*, Cambium (2009), CASSIOPE-ePOP (2010), CHENNS (2014), CIMEX (2011), EBEX, ESA-Exomars*, ESA-MICAST* (2010), ESA-Swarm (2011) (canadian instruments for ion measurement), FPEF (2011), Hypersole (2010)*, ICAPS (2010), IVIDIL (2009), JWST-FGS (2014), MSL-APXS (2011), NEOSAT (2011), NEQUISOL (2010), SPIDER, UVIT-ASTROSAT (2010), Vascular (2009).

*SE missions under review (34): * = 31*

CanALSS*, DynAMO*, ESA-Cross-scale*, EVIS*, FPNS*, GPR*, HALO*, ILN*, Insect Habitat, ISRU*, LEMUR*, LiteArm*, LORE*, LSC*, Lunar Rover*, MEMS LIDAR*, M-FTSIS*, MIM/ATEN, MLM*, MSO-FTIR*, MSO-SAR*, MSR NET (Vision System)*, MWD*, ORBITALS (2014), RAO*, RAPIER*, Ravens*, Remote Care Health*, ROSM*, SBIS*, SCOPE*, SPICA*, TRACTEUR*, VSE*. Missions' descriptions can be found in the electronic version of "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address: <http://www.asc-csa.gc.ca/eng/publications/default.asp#parliament>

Indicator 2 – Performance Analysis

The total of 58 scientific instruments and technological applications can be divided among five fields: 28 instruments/applications were identified for 5 Solar-Terrestrial Relation missions; 22 instruments/applications were identified for 14 Astronomy/Planetary Exploration missions; and 8 instruments/applications were identified for 21 Life/Physical Sciences missions. A ratio of 1.5 instruments/applications per mission is obtained with some missions having as many as 10 related instruments/applications and some missions having none.

Source: Internal documents.

Indicator 3 – Performance Analysis

A total of 397 peer-reviewed papers, reports and conference proceedings acknowledging CSA funding were published in 2008-2009 in Space Astronomy and Exploration, Solar-Terrestrial Relation, and Physical and Life Sciences. This number represents a 4% increase from the 383 reported in 2007-2008.

Source: Internal reporting documents.

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:

<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
115.4	156.6	146.5
2008-2009 – Human Resources (FTEs)		
Planned	Annual	Difference
188.4	181.0	7.4

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

To learn more about Space Science and Exploration, go to:

<http://www.asc-csa.gc.ca/asc/eng/sciences/default.asp> and,

<http://www.asc-csa.gc.ca/asc/eng/exploration/default.asp>

2.2.3) Satellite Communications

SATELLITE COMMUNICATIONS	
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
<u>BENEFITS FOR CANADIANS</u>	
Satellite Communications facilitates the linking of all Canadians by increasing the delivery of non-commercial services to Canadian remote communities, and support federal Government departments' program delivery. Space infrastructure allows access and dissemination of timely health, cultural, security and safety related information to all Canadians wherever they live in Canada. Satellite communications are essential to provide Canadians living in remote areas with timely access to expert knowledge and expertise related to health and education through a range of non-commercial services including: e-government, e-learning, tele-justice, tele-education, as well as tele-medicine.	
<u>EXPECTED RESULT</u>	
State-of-the-art systems and applications are developed to satisfy the needs of the Canadian government and population in order to ensure that Canada remains a world leader in satellite communications.	
<u>MAIN ACCOMPLISHMENTS IN 2008-2009</u>	
The Cascade telecommunications payload, part of the CASSIOPE Mission Contribution Program initiated in 2004-2005, became ready for environmental testing in 2009. The launch is planned for next year. The CSA awarded a contract to finalize the ground segment infrastructure upgrade needed for the utilization of the Government of Canada capacity credit of the Anik F2 satellite by northern communities. The M3MSat mission, the second joint CSA - DND micro-satellite mission (the first one being NEOSSat), will optimize maritime traffic identification. The preliminary design was initiated in June 2008.	
Indicators	Performance
1. Proportion of active missions relative to the total number of missions supported by Canada in the SC priority areas.	None of the 8 missions were active in 2008-2009.
2. Number of technological applications developed as a result of CSA's participation in space missions and/or support to projects/activities in SC.	5 applications.

Indicator 1 – Performance Analysis

(Year) = Actual or projected launch date or date of completion when known.

* = New missions in 2008-2009. However, note that this is the first time this list is compiled for a Departmental Performance Report. There are no new missions.

SC missions at the development stage (4):

CASSIOPE-CASCADE (2010), ESA–Alphasat, ESA-Gallileo SAT (2010), M3MSAT (2011).

SC missions under review (4):

Anik F2 Utilization (2010), Next Generation – Advanced Broadband payload # 1 (2014), PCW (telecommunication aspect) (2016), QuickSat.

Missions' descriptions can be found in the electronic version of "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:

<http://www.asc-csa.gc.ca/eng/publications/default.asp#parliament>

Indicator 2 – Performance Analysis

A total of 5 applications were identified for the 8 missions listed above: Cascade on board of CASSIOPE, Anik F2 ground infrastructure and terminal servicing, the MEOSAR instrument on board Galileo satellite and the RSS-GEMS for traffic identification; 60% of those applications (3/5) were related to Communications whereas the other 40% were related to Security / Search and Rescue. All applications, except one, had national objectives; MEOSAR which is developed in collaboration with ESA will serve the international community.

Source: Internal documents.

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:

<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
26.7	29.1	23.6
2008-2009 – Human Resources (FTEs)		
Planned	Annual	Difference
12.9	15.2	(2.3)

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

To learn more about Satellite Communications, go to:

<http://www.asc-csa.gc.ca/asc/eng/satellites/default.asp>

2.2.4) Generic Technological Activities in support of EO, SE and SC

GENERIC TECHNOLOGICAL ACTIVITIES IN SUPPORT OF EO, SE AND SC	
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
<u>BENEFITS FOR CANADIANS</u>	
Through its R&D investments and the resulting transfers of applications to the private and public sectors, the CSA's programs and activities attract highly skilled labour that contributes to Canada's knowledge-based economy; helps enhance the Canadian space industry's competitiveness by encouraging dynamic trade relationships with other nations; and increases Canada's ability to compete in the global marketplace.	
<u>EXPECTED RESULT</u>	
Canada's industrial technological capabilities can meet the needs of future space missions and activities.	
<u>MAIN ACCOMPLISHMENTS IN 2008-2009</u>	
The development of Technology Roadmaps to guide and prioritize technology R&D at CSA was a key priority in 2008-2009. The priority technologies were defined in consultation with the technology manufacturers, the users and the experts.	
The Space Technology Development Program (STDP) had 4 priority reached an operational level (TRL 6).	
Through the Intellectual Property and Technology Transfer group, the CSA managed 53 active patents for 27 different technologies and 32 licenses, including 22 commercialization licenses.	
By using the Partnership Support Program and NSERC's Collaboration R&D Program, the CSA and NSERC have continued to foster closer collaboration between industry, universities and government in space research and technology development. Eight projects were supported in 2008-2009.	
The David Florida Laboratory conducted 131 tests for the CSA's, another federal department and 31 private-sector clients.	
Indicators	Performance
1. Ratio of the number of priority technologies identified for future EO, SE and SC missions to the number of priority technologies developed in GTA.	The number of priority technologies identified was 43 and the number of priorities having been financially supported for the same period was 21 therefore a ration of 2.1.
2. Number of priority technologies supported that are ready to be used.	The number of priority technologies supported ready to be used is 4 out of the 43 identified (9%).

Indicator 1 – Performance Analysis

Measured for the first time, it is too early to analyse this unique ratio of 2.1. Over the next three years, however, once the CSA's stabilizes its list of priorities, the ratio should get closer to 1, meaning that almost all technological priorities will have been selected and developed.

Source: Internal reporting documents.

Indicator 2 – Performance Analysis

In order to be considered ready to be used, a technology must reach a Readiness Level of "6" or higher. As a new technology proceeds to a higher level of maturity, the risk associated with its implementation in a space mission lessens substantially. It takes time and investments for a new technology to become ready to be used and therefore the priority selection must precede the actual need by a certain number of years. Like for the previous indicator, this one should, over the next three years, demonstrate how the CSA is making a steady progress towards meeting 100% of its identified priorities and therefore reducing its long-term risks.

Source: Internal reporting documents.

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:

<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
48.3	43.8	41.2
2007-2008 – Human Resources (FTEs)		
Planned	Annual	Difference
141.4	116.4	25.0

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

To learn more about the David Florida Laboratory, go to:

<http://www.asc-csa.gc.ca/eng/dfl/default.asp>

2.2.5) Space Awareness and Learning

SPACE AWARENESS AND LEARNING	
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
<u>BENEFITS FOR CANADIANS</u>	
The CSA fosters science and technology literacy as a mean to influence the career choices of young Canadians towards science and technology. It also offers opportunities to enhance the expertise of Canadian scientists, engineers and physicians in space science, space technology and space medicine.	
<u>EXPECTED RESULT</u>	
Targeted level of awareness of space among Canadians is reached.	
<u>MAIN ACCOMPLISHMENTS IN 2008-2009</u>	
The number of visitors to the CSA's interactive website increased by 8% from 1.49 million in 2007-2008 to 1.62 in 2008-2009.	
Over 81 public events including those with astronauts were conducted in communities throughout Canada to raise awareness of Canadian space science and technology. Note that a video presentation was used in 2008-2009 reaching an audience estimated at 100 000 viewers.	
The Space Learning Program conducted 117 learning events, combining in-class experiences, presentations and tele-distance education with primary, secondary and postsecondary students throughout Canada. Over 1.7 million students participated in these learning events, a slight increase from previous year.	
A total of 873 educators participated in professional development workshops. It is a decrease from previous year because the Canadian astronaut missions STS-127 and Expedition 20/21 preceded the distance learning activities.	
Indicator	Performance
1. Survey results obtained every 3 years.	No National Public Opinion survey was conducted in 2008-2009 because of governmental guidelines.

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:
<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
7.9	6.6	6.1
2008-2009 – Human Resources (FTEs)		
Planned	Annual	Difference
29.0	22.1	6.9

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

To learn more about Space Awareness and Learning, go to:

<http://www.asc-csa.gc.ca/asc/eng/media/default.asp>; and,

<http://www.asc-csa.gc.ca/asc/eng/educators/default.asp>

2.2.6) Internal Services

INTERNAL SERVICES	
2008-2009 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
<u>BENEFITS FOR CANADIANS</u>	
The CSA strengthen accountability for results by implementing the government's commitment to modern public service management. Improvement of internal services at all levels of management raises the overall level of organizational performance by providing an added value to CSA managers in the performance of their duties.	
<u>EXPECTED RESULT 1</u>	
Internal Services provide an added value to CSA managers in the performance of their duties.	
Indicator	Performance
1. Services provided meet standards set under Government-wide and CSA policies as well as MAF expectations.	MAF rating from the 2000-2009 Round VI assessments against the 21 area of management indicators were: Strong = 1 Acceptable = 14 Opportunity for improvement = 5 Attention required = 1
<u>Indicator 1 – Performance Analysis</u>	
The Treasury Board's assessment addresses only MAF indicators related to management quality.	
Overall, the results are slightly better than the assessment in 2007-2008. Compared to 2007-2008, 3 areas of management have improved, 14 have remained the same, 2 have declined, and 2 were unable to compare. The number of areas of management at the acceptable level went from 10 to 14 and the number of areas showing an opportunity for improvement declined from 7 to 5. Compared to all the departments and agencies, the CSA rating was at the same level for 17 areas of management, at a lower level for 4 of them, and none was higher.	
During 2008-2009, the CSA has undergone a transition at the presidency level, which has delayed the finalization of a number of MAF related initiatives. In response to round VI assessment, the CSA has assigned an officer of primary interest with an action plan for each areas of management.	
Source: Round VI 2008-2009 Management Accountability Framework (MAF) Assessment.	

EXPECTED RESULT 2

The three highest priority risks identified in the CSA corporate risk profile are addressed and mitigated.

Indicator	Performance
1. Mitigation action plans are implemented against the three corporate risks identified as highest priorities.	3 out of the 6 risk mitigation actions were completed.

Indicator 1 – Performance Analysis

Three out of the 6 risk mitigation actions were completed. Out of the three actions remaining, one was partially met although it showed significant progress towards achieving the targets and two indicators were postponed for Strategic Review and Long Term Space Plan concurrent exercises were prioritized. The CSA assessment concluded that the targeted risk tolerance levels were not reached and therefore remaining actions will be pursued in 2009-2010. The definitions of the priority corporate risks were reviewed in the RPP 2009-2010.

Source: CSA Corporate Risk Profile (internal document).

For more information, go to the electronic version "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address:
<http://www.asc-csa.gc.ca/asc/eng/resources/publications/default.asp#parliament>

2008-2009 – Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
40.6	45.3	42.2
2008-2009 – Human Resources (FTEs)		
Planned	Annual	Difference
270.1	225.4	44.7

Any significant variance reported against Planned Spending set out in the 2008-2009 Report on Plans and Priorities is explained in Section 3.3.1 – Spending by Program Activity.

SECTION 3: SUPPLEMENTARY INFORMATION

3.1 FINANCIAL HIGHLIGHTS

3.1.1) Condensed Statement of Financial Position

As at March 31, 2009

	(\$ in thousands)	% Variance	2009	2008
Assets	Total Assets	-4.4	1,431,235	1,497,535
Liabilities	Total Liabilities	-2.2	106,423	108,788
Equity	Total Equity	-4.6	1,324,812	1,388,747
Total		-4.4	1,431,235	1,497,535

3.1.2) Condensed Statement of Operations

For the period ending on March 31, 2009

	(\$ in thousands)	% Variance	2009	2008
Expenses	Total Expenses	22.5	376,975	307,675
Revenues	Total Revenues	-6.3	6,861	7,320
NET COST OF OPERATIONS		23.2	370,114	300,355

3.1.3) Financial Statements

All pertinent information on CSA's Financial Statements is at the following address:
<http://www.asc-csa.gc.ca/eng/publications/default.asp#parliament>

3.2 SUPPLEMENTARY INFORMATION TABLES

All electronic supplementary information tables found in the 2008-2009 Departmental Performance Report can be found on the Treasury Board of Canada Secretariat's website at: <http://www.tbs-sct.gc.ca/dpr-rmr/2008-2009/index-eng.asp>

Table 1: Sources of Non-Respendable Revenue

Table 2: User Fee Reporting – User Fees Act

Table 3: Policy on Service Standards for External Fees

Table 4: Details on Project Spending

Table 5: Status Report on Major Crown Projects

Table 6: Details on Transfer Payments Programs (TPPs)

Table 7: Response to Parliamentary Committees and External Audits for Fiscal-Year 2007-2008

Table 8: Internal Audits and Evaluations

Table 9: Travel Policies

3.3 OTHER ITEMS OF INTEREST

3.3.1) Spending by Program Activity

Description	Planned Spending (\$ in millions)	Actual (\$ in millions)	Variance (\$ in millions)
Space Based Earth Observation	129.2	46.3	82.9
<u>Comments:</u> The variance of \$82.9 million was mainly due to the following factors: - Reprofiting of \$51.3 million caused by the deferring of closing-out activities in RADARSAT-2 and significant delays in starting preliminary design activities for RADARSAT Constellation; - Reallocation of the surplus of \$25.5 million to other activities, mainly following the redefinition of the Chinook project (\$23.3 million); - Surplus of \$2.8 million incurred in the operation of RADARSAT-1; and, - Reallocation of the surplus of \$2.4 million in the Canada/European Space Agency (ESA) Contribution Program for Earth observation to other Canada/ESA envelopes.			
Space Science and Exploration	115.4	146.5	(31.1)
<u>Comments:</u> The positive variance of (\$31.1 million) was mainly due to the following factors: - Net spending increase of \$11.4 million in Enabling Research activities mainly due to the strengthening of the Space Exploration Core initiative to ensure that Canada is acquiring the level of preparedness and know-how required to seize international exploration mission opportunities at minimum risk and cost; - Spending increase of \$10.2 million in the Canadian Space Station Program to support Dextre and Canadarm2 operations; and, - Net spending increase of \$9.9 million in space science capital projects, resulting from the transfer of an additional \$16.9 million from Chinook to the James Webb Space Telescope project, which was partially offset by reprofiling \$7.0 million in other projects to match cash flows with their long-term development cycle and changes in performance requirements.			

Description	Planned Spending (\$ in millions)	Actual (\$ in millions)	Variance (\$ in millions)
Satellite Communications	26.7	23.6	3.1
<u>Comments:</u> The variance of \$3.1 million was mainly due to the following factors: - Reprofile of \$4.7 million: \$2.4 million in the CASSIOPE Contribution Program following the one-year shifting of the satellite launch date, and \$2.3 million in the M3MSat project caused by delays in reviewing the Security Requirements Checklist. - Net spending increase of \$1.8 million in Enabling Research activities mainly related to the opportunity to demonstrate the capability of detecting distress signals for search and rescue operations by using satellite constellations such as the current Global Positioning System and the future ESA's Galileo system.			
Generic Technological Activities in support of EO, SE and SC	48.3	41.2	7.1
<u>Comments:</u> The variance of \$7.1 million was mainly due to the under-spending of \$5.2 million in Enabling Research activities due to the difficulty in putting in place contracts under the Space Technology Development Program, as a result of new procurement policies and shortage of personnel.			
Space Awareness and Learning	7.9	6.1	1.8
<u>Comments:</u> The variance of \$1.8 million resulted from under spending in public communications activities caused by delays in staffing and contract issuance, and the adjournment of projects.			
Internal Services	40.6	42.2	(1.5)
<u>Comments:</u> The net spending increase of \$1.5 million mainly resulted from improvements in information management & technology systems.			

3.3.2) List of Space Missions

Missions' descriptions can be found in the electronic document called: "Analysis of Program Activities by Strategic Outcome – Detailed Performance Information" at the following address: <http://www.asc-csa.gc.ca/eng/publications/default.asp#parliament>

